

There is no available antidote. There is no contraindication for naloxone administration as a diagnostic and therapeutic agent for opioid reversal. Flumazenil is a specific competitive antagonist at the benzodiazepine receptor and is not an effective reversal agent for GHB poisoning. The use of flumazenil will potentially make treatment of the myoclonic seizure-like activity more challenging, because benzodiazepines are indirect GABA_A agonists and their beneficial effects will be blocked by flumazenil.

Detection of GHB is difficult and not available for most hospital laboratories. The majority of urine toxicology screens may rule out exposure to other drugs and suggest GHB only as a diagnosis of exclusion. The history and clinical course of the patient are the most suggestive in determining the use of GHB. A technique using gas chromatography-mass spectrometry to monitor both plasma and urine samples has been described but is not readily available at most institutions.

GHB has become a popular drug for the adolescent community because it provides a mild euphoric effect, enhances sleep, and is not easily detectable by routine drug testing. It has also been used as a "date rape" drug. Clandestine laboratories may easily obtain the "recipe" and even kits for making GHB from the Internet. Clinical suspicion for its use and abuse in populations is currently the only mechanism to identify those at risk for acute toxicity.

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Limited Bedside Ultrasound Imaging by Emergency Medicine Physicians

ULTRASOUND IS THE diagnostic imaging modality of choice used to evaluate some patients who present to the emergency department with emergent and life threatening conditions. Faced with the challenge of immediately diagnosing conditions such as cardiac tamponade, hemoperitoneum, abdominal aortic aneurysm, and ectopic pregnancy, emergency physicians can use ultrasound at the bedside when examining acutely ill or injured patients. Physicians in private practice and academia are beginning to embrace this technology and are acquiring ultrasound imaging skills. Limited bedside ultrasound examinations can provide specific anatomic information and facilitate immediate life-saving treatment and intervention.

Ultrasound can be used in trauma patients to diagnose hemopericardium and hemoperitoneum. A rapid-focused five- or six-point ultrasound examination of the abdomen

has been described in several studies involving patients with multiple trauma. The technique is performed using a 3.5 MHz probe to view, in sequence, the subcostal region (pericardial sac); the right and left upper quadrants (Morrison's Pouch and perisplenic space); the lateral flanks (paracolic gutters); and the pelvic cul-de-sac. The appearance of an anechoic (black) stripe or space on any of these views indicates the presence of free fluid (blood). This noninvasive bedside technique can be completed within 4 to 5 minutes while other resuscitative measures are in progress. Used in this way, ultrasound is an initial screening tool to determine the need for laparotomy or pericardiectomy. There is some evidence that the use of ultrasound can decrease the number of CT scans routinely ordered to evaluate a patient with blunt abdominal trauma.

Limited pelvic ultrasound examinations can confirm the presence or absence of a live intrauterine pregnancy. Through a transabdominal approach or by using an endovaginal probe, a physician can confirm the presence of an early intrauterine pregnancy by visualizing sonoembryologic structures such as the yolk sac, fetal pole, or embryo within the confines of the uterus. Fetal cardiac motion can also be visualized depending on the age of the pregnancy. These ultrasound examinations can be performed at the bedside in conjunction with the pelvic speculum and bimanual examinations. Within minutes, key anatomic information is obtained to determine which pregnant patients require further evaluation, imaging, and consultation in the emergency department. The discovery of an intrauterine pregnancy on ultrasound rules out the likelihood of ectopic pregnancy in most patients unless risks for heterotopic pregnancy exist.

When resuscitating a patient with cardiac electrical activity but no pulse, ultrasound can differentiate between electromechanical dissociation (EMD) or pseudo-EMD. Within seconds, by scanning through an available transthoracic view, the heart can be visualized and the presence or absence of organized cardiac contractions can be determined. If organized cardiac activity is identified, a search for immediately treatable causes of hypotension can be performed using bedside ultrasound. A small, hyperdynamic heart implies hypovolemia and should prompt aggressive fluid administration in the absence of other causes of hypotension. Cardiac tamponade is suggested by the presence of pericardial effusion with right atrial or right ventricular wall collapse during diastole. A dilated hypokinetic right ventricle may indicate right ventricular infarction or pulmonary embolus.

Ultrasonography, as an imaging modality, is known for detecting abdominal aortic aneurysms. A limited ultrasound examination of the aorta provides anatomic information necessary to exclude the diagnosis of abdominal aortic aneurysm. Unless intervening fat or bowel gas obstructs the view, the diameter and caliber of the abdominal aorta in its entire length can be assessed in less than one minute.

To safely and effectively use these imaging techniques, physicians must first understand the limitations of ultrasound in general and be able to distinguish image artifacts from true pathology. Most importantly, limited

ultrasound examinations do not replace comprehensive formal ultrasound studies. Physician-performed ultrasound examinations should be incorporated into diagnostic strategies that will improve both patient outcomes and the overall quality and efficiency of care delivered in the emergency department.

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